



Carbon Monoxide Workshop

IBEX 2004

Miami Beach, FL

October 27, 2004

Minutes

Sponsored by:

United States Coast Guard
Office of Boating Safety
Recreational Boating Product Assurance Division

The National Institute for Occupational Safety & Health (NIOSH)

Minutes prepared by:

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ABYC
Setting Standards for Safer Boating

USCG / NIOSH CO Workshop
Minutes of Workshop
October 27, 2004

The meeting was called to order by the moderator at 10:15 AM EST.

Appendix A includes all in attendance.

Appendix B includes the presentations.

Opening Remarks

Moderator Dick Blackman, USCG, began the session by discussing a very short history of the past CO seminars.

Presentations

Presenter: Jim Carroll - Southwest Research (see attached presentation)

Mr. Carroll indicated that the study on catalysts and marine engines has concluded. CO standards were not in the scope of the study but were one of the benefits.

Quick facts:

- 480 hours of on-water testing.
- 3 out of 4 engines met the CARB requirement.
- 4th engine burned an exhaust valve.
- reduction in CO at idle was in the area of 99%.
- Peak CO levels were less than 200ppm.
- Visit <http://www.arb.ca.gov/msprog/marine/marine.htm> for the reports.

Presenter: Larry Meddock – WSIA Watersports Industry Association (see attached presentation)

- 99 % of the sport-specific manufacturers are members of the WSIA.
- The “Watersports Responsibility Code” has been updated to add CO information and a poster will be sent to every retailer for display.
- New sport-specific warning label options are industry wide.
- “Boating Bob’s” guide to watersports has been published with CO and safe distance information as a public information piece.
- Expo 2004 (watersports industry trade show) had the first series of seminars, one on CO.

CO/HB Breathalyzer test for wake-surfers:

The objective of this new test is to see the effect of CO on the person involved in the sport. Wakesurfers in particular are the concern. Sniffer tests are not a good indication of what is really happening to the participants. The WSIA is working with Michael King of the CDC using 50 athletes on 6-8 different boat manufacturers boats with carbureted engines. This type of boat is not typically the type used for wakesurfing but could present the worst case scenario. CO will be monitored using a breathalyzer.

Presenter: Mike Samulski – EPA (see attached presentation)

- In Spring 2005, expect a rule on exhaust emission control for PWC, Outboard, and Spark Ignition Generators.
- By 2008, California will be 65% below the EPA regulations. This will also reduce CO and is the methodology the EPA is considering.
- Inboard catalyst testing is the most current data available.
- Generator proposals are still open. Air-cooled engines are being tested *not* water cooled.
- In Spring 2005, there will be a proposal in the federal register and which will contain the target numbers.

Presenter: Sebastian Strauss – BRP (see attached presentation)

- Reduction of CO is in the lower speeds.
- Direct injection two-stroke engines make less NOX, and it is not a trade off with CO.
- Some mechanism has to be used to dilute the CO in the engine. CO levels can never increase above the source concentration. If the source can be reduced then the CO will not increase.
- Water scrubbing testing has been found to be inconclusive.
- Catalysts are unproven in marine outboard engines.
- Post-oxidation treatment can beat the fuel ratio trade-off (e.g. rich mix for a catalyst)
- Excess oxygen is in the exhaust. The engines run almost 10 times leaner than the average engine. High dilution ratios = lower CO content.
- CO is produced by lack of oxygen.

Presenter: Tom Sutherland – Westerbeke

- Safe CO Generator – Two years of research and development has been done.
- Houseboat industry was the genesis of the project to produce models up to 22.5 kw.
- There is additional unit width compared to the size of a standard generator set.
- Price is approximately 20% higher than the conventional unit.
- There is an outside demo being conducted during IBEX 2004.
- Deterioration testing is going on and Westerbeke is filing the necessary paperwork with the EPA.
- The units are only weeks away from shipping to the boat builders.
- Just won the IBEX 2004 innovation award.

Presenter: Kevin Carlan - Mastry Engine Center (Yanmar distributor) (see attached presentation)

General information on diesel alternatives for propulsion engines:

- Dimensionally and weight wise, these diesel and gasoline units are very similar.
- Price has also been an issue in the past. The price is becoming more competitive now that the innovations in gasoline engines are costing more and more each year. Installation is cheaper, having to comply with less stringent standards requirements for diesel fueled boats.
- Diesels can last more hours with less maintenance.
- Warranty is longer.
- Better fuel economy.
- Continuous use ratings are higher on a diesel.
- Acceleration on a ski boat has been a concern; while the diesel came in with slightly lower performance, it did so with only minor Wide Open Throttle (WOT) losses.
- Typically the h.p. on a diesel is lower than its gasoline counterpart.

Presenter: Jeff Wisniewski Marine Technologies Inc.— Outdoor CO detector.

- At the 2004 Miami Boat Show, MTI introduced the concept for a CO detector that can detect CO in an outdoor environment. MTI is looking for help from industry to decide how this sensor could be employed on a boat.

Options:

- Multiple sensor locations with the display at the helm rather than traditional single station location.
- Certain sensors can take readings instantly and could provide a real time readout or be used like a low oil light. Other sensors read every 2 1/2 minutes and work well with Time Weighted Average (TWA) units indoors. But TWA might not be possible outdoors due to rapidly changing air flow and/or wind direction.

Currently, there is no standard for an outdoor detector. However, UL 2075 could be used to List a unit to portions of UL 2034, ABYC A-24 or any other criteria we choose. It's an option for third party testing in the absence of a specific Standard.

(end of presentations)

Mr. Blackman mentioned that express cruiser issues have surfaced and NIOSH and Ancon Marine will be working on researching the scope of this problem.

The floor was opened to questions/comments from the audience.

Comment. (Charlie Game) Perhaps a brainstorming session with the ABYC Gas Detectors PTC to give Jeff (Wisniewski) some parameters might be in order.

Q. (Ralph Lambrecht) There is some power loss in the catalyst. Has that been resolved?

A. (Jim Carroll) *A manifold needs to be designed to decrease the back pressure. The manifold used was to fit the engine inside the existing compartments. The design needs to be improved.*

Q. You had indicated a burned valve. What was the reason?

A. (Jim Carroll) *We don't know why the valve burned, that will have to be looked into.*

**Appendix A – USCG / NIOSH CO Workshop
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**Appendix B – USCG / NIOSH CO
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Presentations**

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Larry Meddock – WSIA Watersports
Industry Association

Mike Samulski – EPA

Sebastian Strauss – BRP

Kevin Carlan - Mastry Engine Center